Earth & Environmental Sciences Division

Paul's Perspectives

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Safety - Ergonomics a message from Jeff

Jeff Hansen, Division ES&H Officer, 667-5043, jchansen@lanl.gov

Ergonomics is the science that studies the human interfaces and interactions with their respective environments. At LANL, this is usually an adjective used describe an injury. If we fail to properly evaluate the way people work and to make the necessary adjustments to the environment, people can sustain serious injuries

Ergonomic problems are rarely solved with just a change in chairs, or a few pieces of furniture, or even a different computer. An employee with work-related ergonomic symptoms should have their work environment evaluated by an ergonomics professional. Employees who are having pain and think it may be caused by an ergonomic issue should notify their supervisor and contact HSR-2 Occupational Medicine. If you believe that you may have symptoms related to your ergonomic environment, you must be evaluated and your supervisor or Jeff Hansen must be notified. In most cases, this evaluation and its outcome must be done before furniture or other physical changes to a work environment are done.

Poor ergonomic conditions are causing about one-third to half of the injuries at LANL. This is also about the same level of injury we see in EES Division. At LANL we have an amazing number of resources for this problem. The Lab-wide web page can be found at: http://int.lanl.gov/safety/ergonomics/ergonomics.shtml.

[Note from Paul: Ergonomic injuries tend to be insidious in that they develop slowly. We should be alert at the first signs of trouble and fix the problems in a timely manner.]

Security - An Ear on the LIR from Tony

Tony Montoya, Acting Division Security Officer (DSO), 7-8065, antonio@lanl.gov.

In 2002, we were asked to look at the Security Laboratory Implementation Requirements (LIRs) and select a LIR that most impacted us and ensure that all requirements are implemented. I selected the Classified Security LIR (LIR 406-00-02.0). Cecilia Gonzales, our Division's Classified Document Custodian, Tom Farmer, EES Division Security Officer (DSO), and I reviewed the LIR and then determined our training needs by sending E-mail to our users. We concluded the process with a training session for users and responsible managers by Dan Valdez, S-2.

This year we have selected the General Security LIR (LIR 406-00-01.0). This LIR requires Security Line Managers to develop and implement Activity Security Plans for specific security activities. These plans are in their final stages and when completed will be on the Division's web page @ http://ees5db.lanl.gov/eesdo/doclosed_access/index.html.

You may access all LIRs and related documents from the LANL home page.

EES Organizational News

Newman is New Hydrology Team Leader
Brent Newman is the new Hydrology Team Leader in EES-2.

Fairley Barnes, Group Leader of EES-2, recently announced the finalization of their process for selecting team leaders. Barnes' announcement included, "The Hydrology Team Leader is Brent Newman. Brent has an active research portfolio in surface and near-surface hydrology and contaminant transport as evidenced by his publications and collaborations. Brent has had major contributions to the ER program efforts over the last 10 years, and he is actively engaged in the current efforts of pathway risk analysis to support sustainable operations at LANL. His research efforts directly support the Division thrusts in Water and Homeland security. Brent has been very proactive in developing new programs and collaborations with external scientists, and he co-hosted an AGU Chapman last year on Ecohydrology. Brent represents the Division very effectively in presentations to technical audiences, program managers and funding agencies. He has supervised technical work safely and effectively, and has been an excellent mentor to colleagues and graduate students. He has an excellent record in managing multiple projects and programs, meeting deadlines and maintain budgets that support several staff within the group. Brent will bring focused attention to new programs and collaborations both within LANL and with external agencies. We are very confident in his ability to lead the Hydrology Team into a successful future and we look forward to working with him."

Congratulations to Paul Rich!
Paul Rich, Team Leader of the EES-9 Geographic Information System Laboratory (GIS-Lab), was recently elected to serve on the Board of Directors for the New Mexico Geographic Information Council (NMGIC) (see http://nmgic.unm.edu).

Budget Update

We continue to operate under the Continuing Resolution. The Senate has rolled the remaining eleven spending bills into an "omnibus" resolution, and this was passed on 23 January. The Bill includes some across-the-board cuts of 1-3%, but also includes some added funds in areas of interest to us. This bill also includes provisions inserted by our Senators to block the recent DOE-driven $70M reduction in Cerro Grande Fire funding which has already generated a stop-work on our efforts, and generated a half-million dollar problem for us, largely in EES-2. The House returns from recess on 28 January, and we hope for a speedy and positive resolution.

Operations news -Thanks!

Thanks to all of you for your immediate engagement with the transitions that are happening in our Laboratory. It was good to have an overflow crowd at our Division meeting: the meeting was video-taped so if you missed it, get a copy and watch! We will continue to see changes as we move toward greater formality of operations and as we improve business systems. Our Interim Director, Pete Nanos, also emphasizes communications, and I have spent quite a few hours this month listening to him in various fora. Pete is also listening to many people, but especially to Group Leaders, recognizing that the real work of the Laboratory happens at the Groups. I, too, have spent a lot of time with the Group Leaders, Deputies, and some of the administrative staff, compiling information on what we do well, what we could do better ourselves, and areas in which we need the help of others. And we're already implementing a lot of these ideas where we can do so ourselves. I've also participated in formulating the inputs to Nanos from

the Associate Director level, and made a few points directly to Pete.

So, what's in the crystal ball? I anticipate that we will see some short-term improvements in our business systems (for example, catching up with backlogs that skew our reporting), and some reports that we have not seen out here "in the suburbs". And I expect to see more organizational changes in the Operational organizations and stronger focus on timeliness and accuracy. Concurrently we will see development of new operational modalities that should simplify our lives, and which will become the basis for the new Enterprise Programs that will bring us into the realm of 21st century business systems.

Staffing changes

In the beginning of February Mark Peters, EES-7 Group Leader, will start a two year assignment to Washington, DC, working with Margaret Chu, head of the Office of Civilian Radioactive Waste Management on long-term planning for the Yucca Mountain program. This is a prestigious assignment which will benefit the Project, the Lab, and Mark. Of course this leaves a major gap in our Las Vegas operations: Doug Weaver is the acting Group Leader, and we have a job ad in the works for a permanent Group Leader (open to internal and external candidates, so please point highly qualified individuals toward this opportunity).

And we gave our good wishes to Rod Whitaker, EES-2, who has taken a three-month long assignment in the Joint Services Office in the Pentagon. I can't say much about what he will be doing there, but it's important and a fine opportunity for Rod (and for the Lab.)

Program Manager for Repository Science

We have selected a new Program Manager for Repository Science. More information to follow very soon.

Deputy EES Division Leader Search

We have completed the interviews for the Deputy Division Leader position, I have completed obtaining references, and I have met with Tom Meyer to discuss the options. I am talking to the top candidate: look for an announcement very soon. My sincere thanks go to Mike Fehler, who was the energetic leader of the search committee, and to the committee members, Cliff Giles (NIS), Tom Baker (C and EEI), Gary Geernaert (IGPP) and EES members Debbie Pirkl, Wendy Soll, and Frank Perry. And a big thank you to the SELT who met with all of the interviews and provided some fine insights. Last but not least to Portia Blackman and Felecia Rider who worked very hard to keep the process moving along in an ope, fair, legal, and timely fashion.)

And speaking of Felicia, she has accepted a job working with Carol Waters, Human Resources Group Leader for the Administration Directorate. This is a part-time position, which will allow her to spend more time with her children. Thanks to Felicia for helping us in 2002 – and for pitching in while Portia was out of the office for some days in January 2003.

Travel & Meetings

Carlsbad trip - EES-12 Visit

I took a trip to Carlsbad on 7 and 8 January with Donna Smith, Division Leader for Institutional Business Development and several of her staff (Ken Freese, Elmer Salazar, Dave Foster). We spent some time with Community Leaders discussing how we could best be good neighbors in business development. The trip generated a number of ideas, and Cliff Stroud (formerly EES-12, now IBD) will be leading the charge to turn these into reality.

Las Vegas trip - DOE Office & EES-7

I was in Las Vegas on 27 January, meeting with John Arthur, the new head of the local DOE Office, Don Pearman, deputy head of the BSC

M&O Contractor for Yucca Mountain and some of the BSC leaders. The march toward Licence Application is going full speed ahead!

I also met with our EES-7 Group, and apprised them of the changes happening here in Los Alamos and the new focus on improved operations. Of course since EES-7 staffers live in the highly regulated Yucca Mountain environment, this will have relatively little (but not zero!) impact. And, of course, I covered the management changes described above and met with Doug Weaver, the acting Group Leader to help ensure a smooth transition.

News from the Science and Engineering Leadership Team (SELT)

The Science and Engineering Leadership Team (SELT) has been very active for the month of January. On January 6, we held a forum to discuss Laboratory Directed Research and Development (LDRD) Exploratory Research (ER) ideas within the Division, provide feedback on proposal ideas, and evaluate the potential split among categories. We heard 19 different ideas, splitting out by category with 4 for Chemistry and Materials Sciences, 10 for Environmental and Biological Sciences, 2 for Information Science and Technology, and 3 for Technology. In addition, we assisted with LDRD Directed Research (DR) pre-proposals. Building on comments provided in December on DR ideas, we provided written comments on DR pre-proposals to the Principal Investigators and the Division Office. In addition, we assisted with the search for the Deputy Division Leader. We had representatives at each candidate's seminar and a subset of the SELT met with each candidate. We then provided written feedback to the Search Committee. We are currently assisting with compiling a slate of nominees for the LDRD ER committees that review proposals. Appreciation was expressed to Claudia Lewis for her very effective leadership of the SELT for the last six months of 2002. The chair has rotated to Dave Breshears until April.
Dave Breshears, Chair, DaveB@lanl.gov

News from the EES Student Ombudsman - Alexis Lavine

Seventeen student interns (UGS and GRA) in EES Division completed the LANL Student Exit Survey at the end of their appointment last summer (15 of the17 EES students were summer students). The survey included both short questions and comments. The following is a general summary of the results, which were mostly positive. Most (82%) of the students felt that their experience working in EES influenced their career and graduate school goals, either by reinforcing what they want to do, or in a couple cases, what they don't want to do. Most students felt that their work experience in EES strengthened their interest in their field of study and provided valuable research experience. Most would like to return to work at LANL. **Students indicated that staff in EES Division were an excellent resource in helping them make decisions about graduate school and what areas of science they wanted to pursue in their careers.** All students felt that safety was taken seriously and incorporated into their work activities. Students had very good to excellent experiences with their mentors, and felt that mentors were available to help and provide guidance with work, graduate school, and career goals. The survey also had questions about the student work plan, LANL student orientation, LANL Student Association Activities, and Housing. Detailed survey results are available from your group leader or Alexis Lavine.
Alexis Lavine, alavine@lanl.gov

Management Walk Arounds

On January 22, Craig Pearson and I did the final inspection of TA-3/206 that will allow EES-11 to vacate 435 SQF of billable space. Many thanks to Dave Anderson, EES-11 who

did a super job cleaning out the rock melt apparatus and other items.

On January 28, I visited the EES-6 Porous Flow Team and IGPP in Otowi, TA-3/261.

Service Anniversaries for January - Congratulations!

Congratulations to the following:
Tony Montoya, EES-DO – 35 years
Dave Broxton, EES-6 – 25 years
Scott Smith, EES-2 – Five-Years

EES Highlights/Accomplishments sent to SR Directorate Office during January

LANL Provides Data for ARM: 10th Anniversary of ARM

According to scientists Thomas P. Ackerman and Gerald M. Stokes in their recently published article, "The Atmospheric Radiation Measurement Program", in Physics Today, the Atmospheric Radiation Measurement Program (ARM) has already begun to lay the foundation for great improvement of climate models, and it serves as an important test bed for the physics of climate and weather-prediction models. An essential data-gathering source for ARM is ARCS (Atmospheric Radiation and Cloud Station Sites). LANL'S Earth & Environmental Sciences Division's Tropical Western Pacific Team operate the climate stations for the DOE's ARM Program at sites in the Pacific in Papua New Guinea, The Republic of Nauru, and Darwin, Australia.

LANL Presents Regional Seismic Event Location in Asia at AGU

Lee Steck and Jill Franks, members of the Earth and Environmental Sciences Division's Ground-based Nuclear Explosion Monitoring Team, presented research summarizing the scope of the seismic event location effort at LANL. The presentation was given at the American Geophysical Union's fall meeting in San Francisco. The paper was co presented by undergraduate student, Jill Franks, who made significant contributions to the paper during her undergraduate work at LANL.

EEScience

Guest Editorial

Effects of Introduced Materials on Water Samples from a Field Heating Test

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The Drift Scale Test (DST) is a long-term underground heating test at Yucca Mountain, Nevada. It combines investigations of coupled thermal-mechanical, -hydrologic, and -chemical processes in an environment that simulates the heated rock surrounding a radioactive-waste emplacement drift (tunnel). The eight-year test, with four years each of heating and cooling, is a joint effort of LBNL, LLNL, SNL, LANL, and the USGS, managed by Bechtel SAIC for the DOE Yucca Mountain Project.

During the course of the test, the pore fluids in the rock migrate in response to heating. Packed-off intervals in hydrologic-sampling boreholes are pumped periodically to collect any water that is present. The water sampling is intended to document the evolution of fluid compositions resulting from water-rock interactions under a thermal load. The capability of numerical models to predict the changing composition and distribution of water is evaluated by comparison with data from water samples collected during the course of the test. The numerical models do not account for interactions of rock fluids with introduced materials. Such interactions were considered

during the planning of the test and materials were chosen for their putative chemical stability to temperatures above boiling.

Most water samples collected from the test block were predominantly steam condensed in the sampling system. About a dozen samples with ionic strengths higher than that of pre-test pore water have also been collected. A subset of these samples have very high contents of chloride and sulfate and very acidic pH values. In Figure 1, these samples plot well below the line corresponding to the sodium: chloride ratio of rock salt. The chloride enrichment led us to suspect that these water compositions did not result from simple evaporative concentration of pore water or enhanced water-rock interaction at elevated temperatures.

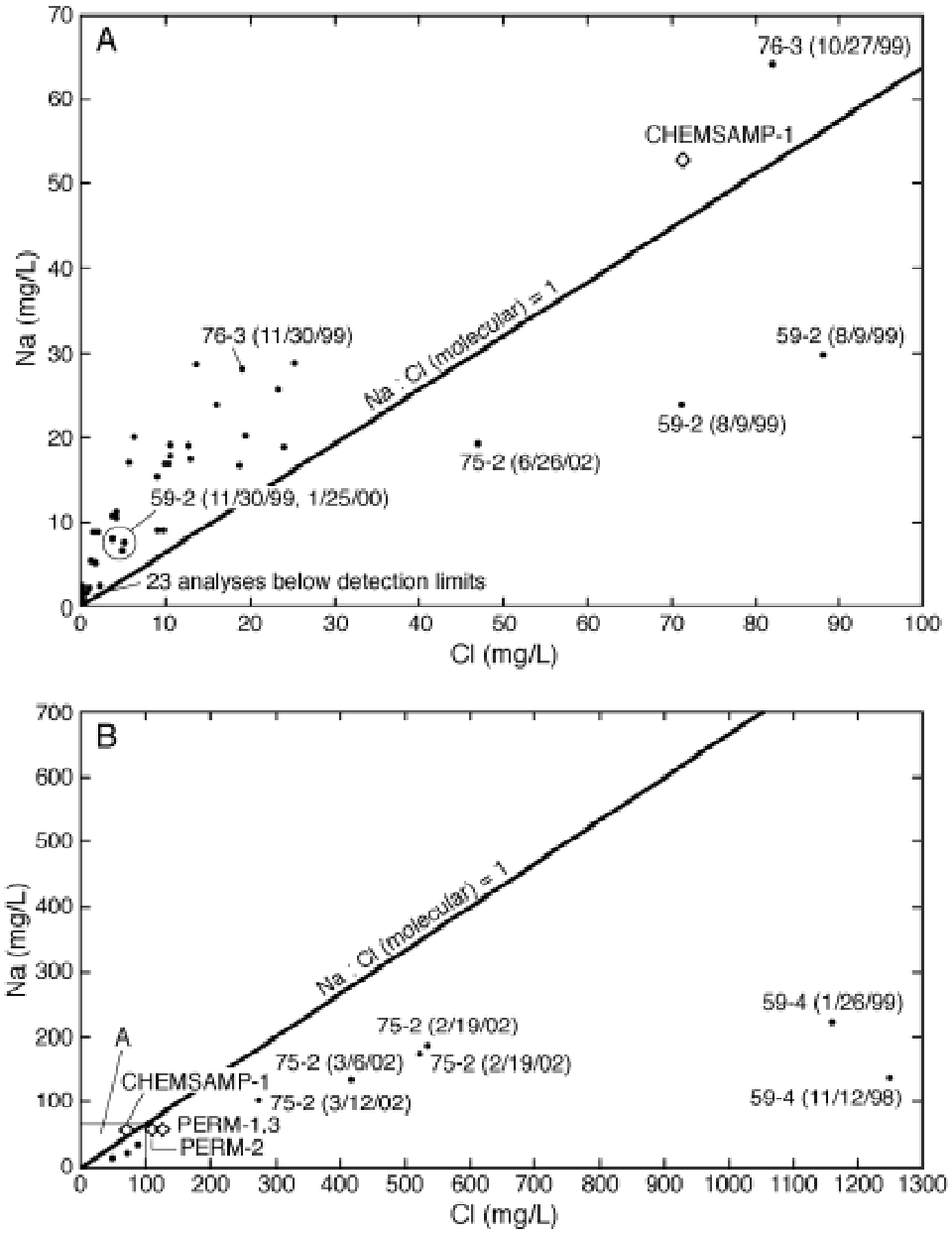

Figure 1. Sodium versus chloride for water analyses from the DST. A) Analyses with low to moderate chloride contents. B) Analyses with moderate to high chloride contents. Unlabeled points are 75-2 (6/26/02) and 59-2 (8/9/99, two points), also shown in A. Diamond symbols in both diagrams denote pore waters extracted from rock cores (PERM samples are pre-test pore waters, CHEMSAMP sample was collected after four years of heating).

One potential non-rock source of chloride (and sulfur) could be the borehole packers, fabricated from the elastomer polychloroprene (neoprene). Laboratory heating tests with polychloroprene confirmed that the elastomer can release hydrogen chloride gas upon heating in air. As the gas dissolves in water, an acidic solution is produced. The effect of lowered pH was detected in the laboratory at temperatures as low as 60∞C. In the context of the field test, the acidic solution could attack the rock and man-made materials in a borehole. The high-chloride, acidic water samples also contained detectable chromium, manganese, and zinc probably derived from corroded metal fittings.

As shown in Figure 1, the majority of water samples with compositions that could represent pore fluids probably have been tainted by interactions with polychloroprene degradation products. We assume the line representing Na: Cl = 1 is an approximate boundary between waters that have interacted with the natural rock system and waters that have received chloride input from a non-rock source. This study underscores the importance of taking interaction effects into account when designing tests and when interpreting water chemical analyses.

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